UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/508,418	06/08/2000	MAMORU HORIKOSHI	Q58140	1158

7590 02/27/2003

SUGHRUE MION ZINN
MACPEAK & SEAS
2100 PENNSYLVANIA AVENUE NW
WASHINGTON, DC 20037

EXAMINER
STEADMAN, DAVID J

ART UNIT	PAPER NUMBER
1652	

DATE MAILED: 02/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Advisory Action	Application No.	Applicant(s)	
	09/508,418	HORIKOSHI ET AL.	
	Examiner	Art Unit	
	David J. Steadman	1652	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE. Therefore, further action by the applicant is required to avoid abandonment of this application. A proper reply to a final rejection under 37 CFR 1.113 may only be either: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114.

PERIOD FOR REPLY [check either a) or b)]

a) ☐ The period for reply expires _____months from the mailing date of the final rejection.

b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection. ONLY CHECK THIS BOX WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1.☒ A Notice of Appeal was filed on *10 February 2003*. Appellant's Brief must be filed within the period set forth in 37 CFR 1.192(a), or any extension thereof (37 CFR 1.191(d)), to avoid dismissal of the appeal.

2.☐ The proposed amendment(s) will not be entered because:

(a) ☐ they raise new issues that would require further consideration and/or search (see NOTE below);

(b) ☐ they raise the issue of new matter (see Note below);

(c) ☐ they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or

(d) ☐ they present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: _____.

3.☒ Applicant's reply has overcome the following rejection(s): *see attached*.

4.☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).

5.☒ The a)☐ affidavit, b)☐ exhibit, or c)☐ request for reconsideration has been considered but does NOT place the application in condition for allowance because: *see attached*.

6.☐ The affidavit or exhibit will NOT be considered because it is not directed SOLELY to issues which were newly raised by the Examiner in the final rejection.

7.☒ For purposes of Appeal, the proposed amendment(s) a)☐ will not be entered or b)☒ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: _____.

Claim(s) objected to: *2 and 5*.

Claim(s) rejected: *1 and 8*.

Claim(s) withdrawn from consideration: *9-26*.

8.☐ The proposed drawing correction filed on _____ is a)☐ approved or b)☐ disapproved by the Examiner.

9.☐ Note the attached Information Disclosure Statement(s)(PTO-1449) Paper No(s). _____.

10.☒ Other: *Notice of References Cited*

David J. Steadman

ADVISORY ACTION

1. Claims 1, 2, 5, and 8-26 are pending in the application.

2. Claims 1 and 8 stand finally rejected.

3. Claims 2 and 5 are objected to as being dependent upon a rejected base claim but are otherwise in condition for allowance.

4. Claims 9-26 remain withdrawn from consideration.

5. Applicants' cancellation of claims 3, 4, and 7 and amendment to claims 1 and 8 in Paper No. 24, filed 02/10/03, is acknowledged.

6. The request for reconsideration has been considered but does not place the case in condition for allowance for the reasons discussed below.

7. Applicants' arguments presented in Paper No. 24 have been fully considered and are deemed to be persuasive to overcome the following objection(s) and/or rejection(s):

a. The rejection of claims 3 and 4 under 35 U.S.C. 112, second paragraph (see items 2-4 of Paper No. 21),

b. The new matter rejection of claims 1-5, 7, and 8 under 35 U.S.C. 112, first paragraph (see item 5 of Paper No. 21),

c. The written description rejection of claims 3 and 7 under 35 U.S.C. 112, first paragraph (see item 6 of Paper No. 21),

d. The scope of enablement rejection of claims 3 and 7 under 35 U.S.C. 112, first paragraph (see item 7 of Paper No. 21).

8. The written description rejection of claims 1 and 8 under 35 U.S.C. 112, first paragraph, is maintained for the reasons of record and the reasons stated below. The rejection was fully explained in previous Office actions (see item 11 of Paper No. 13 and item 6 of Paper No. 21).

Applicants argue (see item D beginning at page 5 of Paper No. 24) the specification fulfills the written description requirement of 35 USC 112, first paragraph as the claims encompass a genus of proteins derived from a single organism, having a defined activity, and having resistance to a specific

group of compounds. Applicants argue the genus of claimed polypeptides are limited to a small group that are adequately described in the specification. Applicants argue the types of mutations that may be made to the polypeptide are disclosed in the specification. Applicants' arguments are not found persuasive. While the source and function of the claimed genus of polypeptides are adequately described in the specification, the specification fails to adequately describe the structures of all species of claimed polypeptides. As written, the claims encompass the structures of *any* protox polypeptide having the functions recited in the claims. It is noted that the claims are not so limited to a protox polypeptide from *N. tabacum* as the claims are drawn to a protox from *N. tabacum* or derivatives thereof. The disclosure of a single representative species of protox polypeptide, i.e., SEQ ID NO:2, is insufficient to describe the structures of all derivatives or mutant protox polypeptides as encompassed within the claimed genus. One of skill in the art would recognize that there exists substantial structural variation within the genus of claimed protox polypeptides. When there is substantial variation within a genus, one must describe a sufficient variety of species to reflect the variation within the genus. The disclosure of a single representative species, i.e., the amino acid sequence represented by SEQ ID NO:2, is not representative of the variety of structures of protox polypeptides encompassed by the claims. Furthermore, a skilled artisan would not be able to predict those structures having the functions as recited in the claims. For inventions in an unpredictable art, adequate written description of a genus which embraces widely variant species cannot be achieved by disclosing only one species within the genus. Given this lack of description of representative species encompassed by the genus of the claims, the specification fails to sufficiently describe the claimed invention in such full, clear, concise, and exact terms that a skilled artisan would recognize that applicants were in possession of the claimed invention.

9. The scope of enablement rejection of claims 1 and 8 under 35 U.S.C. 112, first paragraph, is maintained for the reasons of record and the reasons stated below. The rejection was fully explained in previous Office actions (see item 12 of Paper No. 13 and item 7 of Paper No. 21).

Applicants argue (see item E beginning at page 6 of Paper No. 24) the specification enables the entire scope of claimed polypeptides as the claims have been amended to limit the scope of polypeptides

to protox polypeptides derived from a single organism, having a defined activity, and having resistance to a specific group of compounds. Applicants argue the specification provides guidance for creating expression vectors encoding the claimed polypeptide, transforming a plant with said expression vector, and screening the transformed plant to identify those polypeptides encompassed within the scope of the claims. Applicants argue that the guidance provided by the specification enables a skilled artisan to make the entire scope of claimed polypeptides. Applicants' arguments are not found persuasive. Undue experimentation would be required for a skilled artisan to make the entire scope of claimed polypeptides. Factors to be considered in determining whether undue experimentation is required, are summarized in *In re* Wands (858 F.2d 731, 8 USPQ 2nd 1400 (Fed. Cir. 1988)) as follows: (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claim(s). The claims are so broad as to encompass *any* polypeptide having the recited activities. It is noted that the claims are not so limited to a protox polypeptide from *N. tabacum* as the claims are drawn to a protox from *N. tabacum* or derivatives thereof. The specification has provided guidance for making a protox polypeptide in the form of a single working example, i.e., SEQ ID NO:2. The disclosure of SEQ ID NO:2 is insufficient to enable the entire scope of derivatives or mutant protox polypeptides as encompassed within the scope of the claims. While methods of generating mutants is well known in the art, neither the specification nor the prior art provides a skilled artisan with the necessary guidance and direction for mutating residues of a protox polypeptide with an expectation of making a polypeptide having the desired characteristics. The art provides numerous instances of a mutation or mutations within a polypeptide's amino acid sequence that result in a loss of function or completely alter the function of a polypeptide. For example, Williams et al. (*Biochemistry* 37:7096-7102) teach a single mutation in a polypeptide that results in loss of polypeptide function. Also, Witkowski et al. (*Biochemistry* 38:11643-11650) teach a single mutation in a polypeptide's amino acid sequence that results in complete conversion of the polypeptide's function. While neither of the polypeptides as described by Williams et al.

or Witkowski et al. are a protox polypeptide, these disclosures nonetheless provide evidence of the unpredictability of the effects of amino acid mutation(s) on the function of a given polypeptide. As such, one of skill in the art would recognize the effect(s) of one or more mutations within a polypeptide's amino acid sequence is highly unpredictable and neither the specification nor the prior art provides guidance or direction regarding those amino acids that are necessary and those that are not necessary for protox activity and resistance to photobleaching herbicide. Therefore, the amount of experimentation required to make the entire scope of claimed polypeptides would be far from routine.

Thus, applicants have not provided sufficient guidance to enable one of ordinary skill in the art to make and use the claimed peptides in a manner reasonably correlated with the scope of the claims. The scope of the claims must bear a reasonable correlation with the scope of enablement (*In re* Fisher, 166 USPQ 19 24 (CCPA 1970)). Without sufficient guidance, determination of having the desired biological characteristics is unpredictable and the experimentation left to those skilled in the art is unnecessarily, and improperly, extensive and undue. See *In re* Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988).

10. The rejection of claims 1 and 8 under 35 U.S.C. 102(b) as being anticipated by Ward et al. (WO95/34659; hereafter referred to as "Ward") is maintained. The rejection was fully explained in previous Office actions (see item 13 of Paper No. 13 and item 8 of Paper No. 21). Applicants argue (see item A beginning at page 7 of Paper No. 24) claim 1 has been amended to limit the polypeptides to those derived from *N. tabacum* and that Ward does not teach polypeptides derived from *N. tabacum.* Applicants argue the resistance mutation as disclosed in the specification results in a greater than 10-fold increase in resistance as compared to the polypeptide of Ward. Applicants' arguments are not found persuasive. Regarding the argument that the polypeptide of claim 1 is limited to derivatives of *N. tabacum*, it is noted that the limitation provided in claim 1 for a polypeptide from *N. tabacum* or derivatives thereof in no way limits the polypeptide to being isolated from *N. tabacum.* The examiner has interpreted the term "derivative thereof" as being any sequence, not limited to a polypeptide isolated from *N. tabacum.* Thus, while the polypeptide of Ward is an *A. thaliana* polypeptide, the reference of Ward meets all limitations of the claims. Regarding the argument that the disclosed polypeptide of SEQ ID NO:2 has a greater

resistance to herbicide than the polypeptide of Ward, this limitation is not recited in the claim. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Thus, the reference of Ward anticipates the claimed polypeptide.

11. The rejection of claim 1 under 35 U.S.C. 102(e) as being anticipated by Volrath et al. (US Patent 5,939,602; hereafter referred to as "Volrath") is maintained. The rejection was fully explained in previous Office actions (see item 14 of Paper No. 13 and item 9 of Paper No. 21). Applicants argue (see item B beginning at page 8 of Paper No. 24) the claim has been amended to limit the mutant polypeptides to those having "an enzyme activity equivalent to that of said protoporphyrinogen oxidase" and therefore, all claimed polypeptides must have an enzyme activity equivalent to that of SEQ ID NO:2. Applicants argue because the protox polypeptide of Volrath does not have an activity equivalent to SEQ ID NO:2, Volrath does not anticipate the claimed polypeptide. Applicants' arguments are not found persuasive. It is noted that applicants again argue limitations that are not recited in the claim. There is no indication in claim 1 that the activity of the mutant polypeptides is required to be "equivalent to SEQ ID NO:2". Instead, the claim recites, "equivalent to that of said protoporphyrinogen oxidase" referring to a "protoporphyrinogen oxidase from *Nicotiana tabacum*, and derivatives thereof... ...comprising... ...SEQ ID NO:2 or a mutated peptide having deletion, addition, or substitution". The activity of the mutant protox polypeptide is required to be equivalent to SEQ ID NO:2 *or a mutated polypeptide.* Therefore, the polypeptide of claim 1 is not required to have an activity that is equivalent to SEQ ID NO:2, but can have an activity equivalent to *any* protox polypeptide. Thus, the reference of Volrath anticipates claim 1.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Steadman, whose telephone number is (703) 308-3934. The examiner can normally be reached Monday-Thursday from 6:30 am to 5:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapura Achutamurthy, can be reached at (703) 308-3804. The FAX number for official correspondence to Group 1600 is (703) 308-4242. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Art Unit receptionist whose telephone number is (703) 308-0196.

David J. Steadman, Ph.D.
Patent Examiner
Art Unit 1652

PONNATHAPU ACHUTAMURTHY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600